DAMAGE BY GOLDEN-FRONTED AND LADDER-BACKED WOODPECKERS TO FENCE POSTS AND UTILITY POLES IN SOUTH TEXAS

JOHN V. DENNIS

WOODPECKER damage to utility poles is a matter of serious economic concern in many parts of North America. The problem dates back into the last century, and periodically has received serious attention from ornithologists and utility engineers. An early study by McAtee (1911) showed that poles treated with a preservative as well as untreated poles are attacked, and that at least eight species of woodpeckers are responsible for damage.

However, neither McAtee nor other early writers seem to have recognized the situation existing in south Texas where two pole-damaging species of woodpeckers occupy the same habitat. Most writers blame the Golden-fronted Woodpecker (*Centurus aurifrons*) (Fig. 1) for the extensive damage that occurs. Sennett (1878*a*), for example, reported that utility poles were a favorite nesting place of the Golden-fronted and that "hardly a pole" was free of their holes. He concluded that telegraph pole excavations by this species were made "in search of a large species of borer that works in dry wood" (Sennett, 1878*b*).

The only other resident woodpecker of the lower Rio Grande Valley is a sparrow-sized bird, the Ladder-backed Woodpecker (*Dendrocopos scalaris*). Sennett (1878*a*) implied that this species also nested in utility poles. Simmons (1925), writing of the region of Austin, Texas, states that "when suitable trees are not to be found" the Ladder-backed nests in cedar fence posts or telegraph poles. McAtee (1911) and Pearson et al. (1936) mentioned the Ladder-backed in connection with utility pole nesting. Until recently the Golden-fronted has received much more blame for utility pole damage (Bendire, 1895; McAtee, 1911; Friedmann, 1925; Simmons, 1925; Pearson et al., 1936; Quillin in Bent, 1939).

The present paper attempts to define the roles played by the Ladder-backed and Golden-fronted woodpeckers in regard to utility pole and fence post damage in Texas from about Victoria and San Antonio southward. Other objectives are to describe damage and to explore reasons for attack. These are subjects discussed earlier by Dennis (1964), but which have now been examined further. Methods of preventing attack are beyond the scope of the present paper and will not be covered.

Observations in south Texas now cover three nesting seasons as well as appreciable periods during the non-nesting season. During the winters of 1960–1961 and 1961–1962, observations were made in parts of the Lower

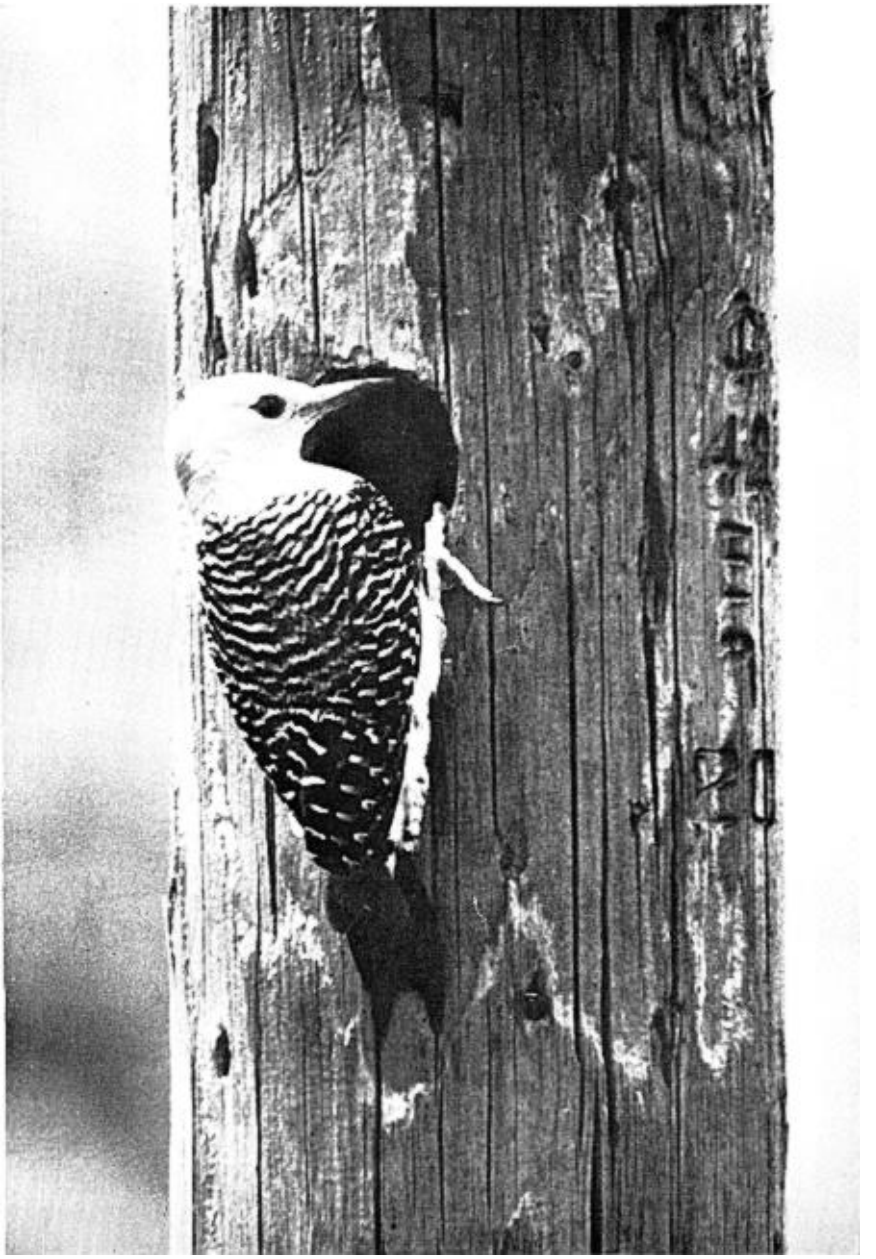

FIG. 1. Female Golden-fronted Woodpecker at nest hole in a small electric distribution pole. Hole is about six feet from the ground.

Rio Grande Valley and south Texas where both the Golden-fronted and Ladder-backed are abundant. During the late winter and spring of 1965, the writer with Robert L. Rumsey of the Southern Forest Experiment Station, established a number of tests in south Texas for the purpose of comparing susceptibility of certain woods and treated versus non-treated woods to attack by Golden-fronted and Ladder-backed woodpeckers. This work was part of a much wider program to find better methods of protecting wooden utility poles from damage by woodpeckers. The program is under the direction of the Southern Forest Experiment Station at Alexandria, Louisiana, and is financed by several electric utility companies and a lumber company.

HABITAT AND NUMBERS

In Mexico the Ladder-backed is said to be found "virtually country-wide in arid districts," and the Golden-fronted in "dry districts with sparse or second-growth timber" (Blake, 1954). In Texas the two are almost always associated with the mesquite-dominated chaparral that extends northward from Mexico into the hot, arid, southern, central, and western parts of the State. Although land clearing has destroyed vast areas of mesquite, it seems probable that more mesquite scrubland exists today than at the time of Sennett's writings in 1878. Since mesquite spreads with intensive grazing, it is not surprising that it has become established widely over the more arid rangeland of Texas. Brooks (1933), writing of the Brownsville region, mentions the rapid invasion of mesquite over the once wide coastal prairies.

Oaks and mesquite are the species usually mentioned as affording habitat for the two species. Simmons (1925), besides listing oaks and mesquite, states that the Golden-fronted is partial to pecan groves and the Ladder-backed to cottonwoods and hackberry. In extremely dry and treeless sections of the Southwest the Ladder-backed is found closely associated with yucca and agave. Grinnell and Swarth (1913) state that the birds nest in the dried stalks of these plants in desert regions of southern California. Bancroft (1930) reports that a race of the Ladder-backed in lower California confines its nesting to the saguaro cactus.

Neither the Ladder-backed nor Golden-fronted has adapted to the more intensively cultivated parts of the Rio Grande Valley and Texas coast, but both have responded to shade tree plantings. The Golden-fronted, in particular, has responded to man-created environments, and shows a strong affinity for introduced palm trees.

Both Sennett (1878*b*) and Bendire (1895) found that the Ladder-backed was much less numerous than the Golden-fronted in the Lower Rio Grande Valley. While their conclusions may be accurate, it should be emphasized that the larger, more colorful and vocal Golden-fronted often displays in the open,

easily conveying an exaggerated impression of its numbers. The less conspicuous Ladder-backed, on the other hand, is apt to be overlooked. In a random selection of Christmas Bird Counts, the writer has noted that total numbers of the two were about the same at 12 localities in Texas reporting both species—187 Golden-fronted Woodpeckers and 182 Ladder-backed Woodpeckers (Cruickshank et al., 1958). These recent results agree with those obtained by the writer, who found the two species to be about equally numerous throughout south Texas.

ROLE OF THE LADDER-BACKED VERSUS THE GOLDEN-FRONTED

Special attention was given to the comparative roles played by the Ladder-backed and Golden-fronted Woodpeckers in damage to poles and posts. It was concluded that the Golden-fronted rarely initiates attack, but rather appropriates and enlarges holes already made by the smaller Ladder-backed. Supporting evidence may be summarized as follows:

1. Golden-fronted Woodpeckers have appeared as occupants of sites where Ladder-backs were actively at work earlier in the same nesting season.
2. There is no evidence of damage to utility poles or crossarms in towns and cities in the Rio Grande Valley where the Golden-fronted is reasonably common and the Ladder-backed is rare or absent.
3. Golden-fronteds are rarely seen working on utility poles. They spend much of their time on poles, but this time is utilized chiefly in such activities as guarding nesting sites, "loafing," searching for food in checks, and taking part in courtship displays. Ladder-backs, however, when seen on poles or fence posts, are rarely engaged in anything but hole excavating activity.

LOCATION OF DAMAGE

Each of the several species of woodpeckers that attack utility poles has its special mode and place of attack; the Pileated (*Dryocopus pileatus*) concentrates on the mid- and upper-mid portions of transmission poles; the two flickers (*Colaptes cafer* and *C. auratus*) on lower portions of the pole, often close to the ground; and other pole-damaging species have equally rigid zones of attack (Dennis, 1964).

The Ladder-backed conforms to this pattern by concentrating its attack at special localized points on poles, fence posts, and other structures. However, it exceeds all other pole-damaging species in the wide diversity of its attack. Among its targets are every wooden utility pole attachment, road marker posts, sign posts, fencing boards, wooden railings, and clapboard on houses. Furthermore, the writer has been told by utility engineers within the Ladder-backs' range that lead sheathing on overhead cables is sometimes damaged.

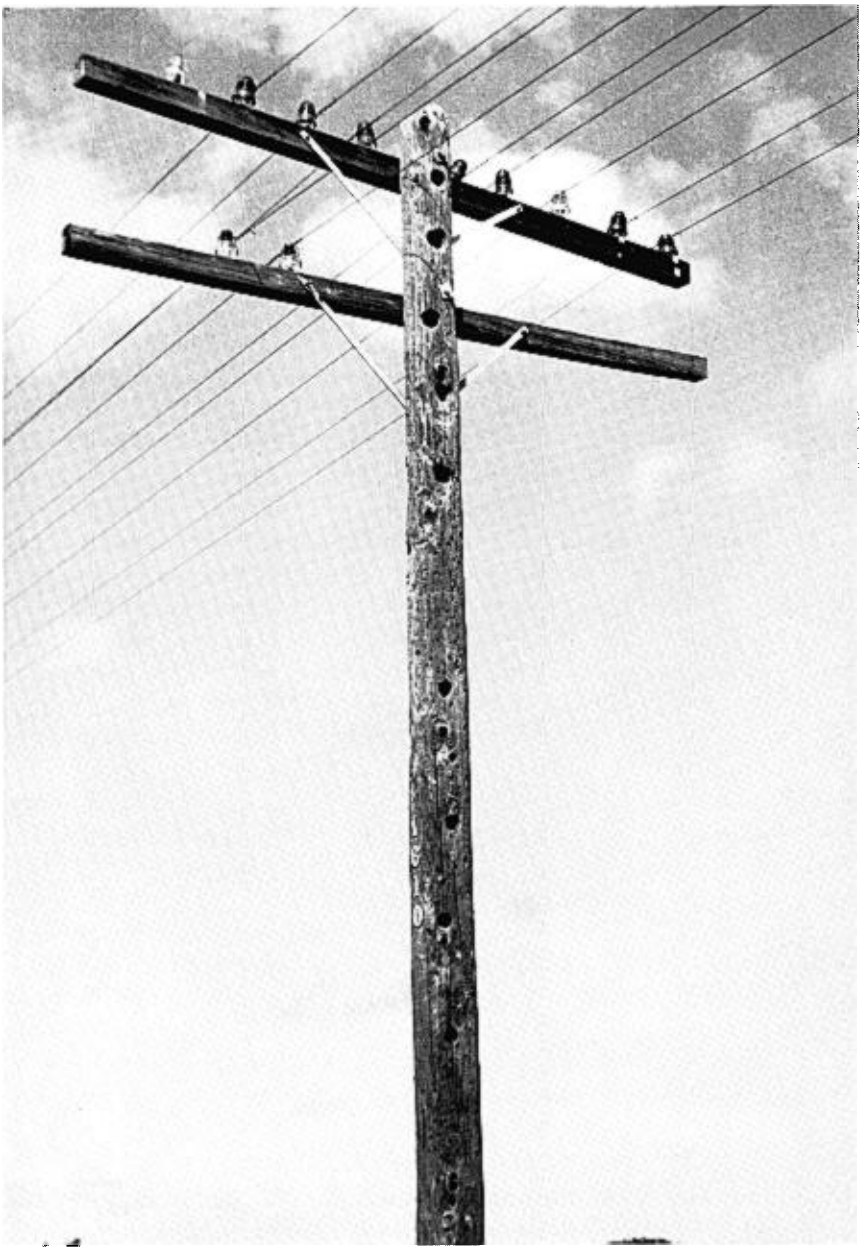

FIG. 2. Distribution of holes on this telephone pole is typical of Ladder-backed's work. Heaviest attack is near the top of pole. A few holes are found on the lower portion and beginning almost from the ground level.

Attack on utility pole structures by the Ladder-backed is characterized by heavy damage to crossarms and braces, and frequent heavy damage to the top 2 or 3 feet of the pole. Damage sometimes extends from ground level to the top of the pole (Fig. 2). Attack on crossarms and braces always originates on the underside, never the sides or top. Typically, a crossarm is drilled at a site on the underside from 6 to 18 inches from the end. The purpose of this drilling is apparently the excavation of a roosting or nesting hole. Rarely are these holes completed. Often the bird "misjudges" the dimensions of the crossarm and breaks "windows" in one or both sides, or breaks a hole in the top. In other cases, the bird appears to tire of its work and discontinues after drilling only an inch or two. In the rare instances that a cavity is completed, the tunnel always leads from the entrance toward the pole—never away from the pole. Completed cavities in crossarms are from 6 to 10 inches in length.

Attack on fence posts is much like that on utility poles. Roosting and nesting holes are largely confined to the top few inches of the post, and many more are started than are completed. Damage to utility poles and fenceposts can be described best under three headings: (1) small poles with crossarms (electric distribution and telephone poles), (2) large poles with crossarms (electric transmission poles), and (3) fence posts.

Small poles.—A total of 155 small poles in seven separate electric distribution lines were checked for location of damage and severity of damage in relation to habitat. The poles had been in service from 4 to 19 years and ranged from 20 to 40 feet tall; each had a single crossarm attached. With the exception of one line in which the treatment was pentachlorophenol, all poles were treated with creosote. Poles were southern pine and crossarms were penta-treated Douglas fir. All but a few poles were damaged (only holes 2 inches or more in diameter were tallied). The heaviest damage occurred through dense mesquite shrub, where poles had an average of 3 holes each. Lightest damage—0.5 hole per pole—was found in a line through small bottomland hardwoods along the Rio Grande. Damage was intermediate where lines passed through habitats with predominately large hardwood, and mixed oaks and mesquite.

One hundred and seven pressure-treated, southern pine telephone poles were examined on six different lines. The poles ranged from 15 to 30 feet tall and had two to three crossarms. Only 0.8 hole per pole was found where lines were surrounded by solid stands of oak; in contrast an average of 2.5 holes per pole occurred in lines through mesquite scrub. Severity of damage was about the same as on the electric distribution lines.

Combining data from telephone and electric distribution lines, about 26 per cent of all holes were in the top foot of poles, 30 per cent were at the crossarm level, 30 per cent were in crossarms, and the remainder below the crossarms.

Overall, 80 per cent of the damage was in the top 3 feet and in the crossarms.

Large poles.—Several kinds of transmission pole constructions are found in south Texas. The poles are southern pine, pressure-treated with creosote, and typically 55 feet in height. The various braces and crossarms are penta-treated Douglas fir. In April 1965, 30 consecutive 2-pole, H-frame structures of a transmission line west of Falfurrias were checked for woodpecker damage. As was the case with the smaller poles, this line seemed to be a typical example of the kind of woodpecker damage to be expected where adjacent habitat supports a large population. Habitat along this line consisted of dense mesquite scrub.

Approximately 75 per cent of the larger holes were found in X- and V-brace structures, only 24 per cent in the pole, and 1.6 per cent in the crossarms. This is in marked contrast to the heavy damage typically found in crossarms on electric distribution lines and telephone lines. That Douglas fir crossarms on this line and other transmission lines examined have been free or nearly free of attack defies explanation. Whether a factor, such as elevation from the ground or the thickness of the crossarm, plays a role in degree of attack on the different structures in unknown. However this may be, the damage to the pole itself on transmission lines has seldom been found to be severe and is largely confined to the top few feet.

Fence posts.—Although several species of woodpeckers attack both utility poles and fence posts, attack upon creosoted pine fence posts for the purpose of making roosting and nesting holes seems to be a highly restricted habit that is perhaps confined to only the Ladder-backed Woodpecker. Numerous instances were found in which the Golden-fronted had occupied holes in creosoted pine fence posts, but from all evidence, such holes were originally the work of the Ladder-backed.

Creosoted pine posts have been used on a large scale in south Texas only during the last 10 to 20 years. The traditional fence posts of the region are red cedar (*Juniperus virginiana*) and mesquite (*Prosopis juliflora*) which are naturally resistant to decay. Pressure-treated creosoted pine, however, is becoming more popular as a fence post material. Pressure-treated penta-pine posts also are beginning to make an appearance. Red cedar, the most widely used fencepost material, is virtually immune to woodpecker attack. Occasionally a roosting or nesting hole is found in a red cedar post, but upon examination the post is usually found to be in an advanced state of internal decay. More often, a few "probe holes," which rarely penetrate any deeper than the sapwood, are found in sound posts. In response to an inquiry to the U.S. Forest Products Laboratory at Madison, Wisconsin, John W. Rowe (pers. comm., 5 April 1961) furnished the following information regarding possible reasons why red cedar is so seldom attacked by woodpeckers:

"Woodpeckers apparently attack wood either to find insects or when they hear a hollow sound such as might come from either heartwood rot or shake (the ease of hollowing out for nesting?). These *Juniperus* species contain a high percentage of heartwood which is rich in toxic extracts . . . They are considered fairly resistant to attack by microorganisms and fungi, and are probably also fairly resistant to insect attack . . . The heartwood is thus resistant to rot, and in addition is relatively hard and does not commonly form shake cavities. This should all tend to render these *Juniperus* spp. relatively unattractive to woodpeckers."

Mesquite fence posts, readily recognized by their crookedness, are also widely used in south Texas. They are somewhat more subject to woodpecker attack than red cedar. Roosting and nesting holes are sometimes found, and if the post has a marked lean or crook, the hole is invariably on the undersurface. Solid posts without decay seem to be avoided. Mesquite posts generally seem to be free of small "probe" holes and miscellaneous damage. However, in some parts of south Texas, for example along the highway between Alice and George West, attack upon mesquite posts is quite common.

By far the heaviest attack is upon creosoted pine. Wherever such fence lines were checked in mesquite-scrub habitat, there was evidence of damage similar to that found on utility poles, specifically holes near the top, widening of checks, minor surface peck marks and scaling. The ratio of completed to uncompleted holes does not vary strikingly from that found on utility poles and crossarms. For example, in a check of 50 distribution poles and 60 crossarms at the Welder Refuge near Sinton, only 5 per cent of all holes were completed roosting and nesting cavities (Dennis, 1964). On 525 creosoted pine fence posts at the Laguna Atascosa National Wildlife Refuge near San Benito, Texas, 11 per cent of all holes were completed roosting and nesting cavities. The poles and crossarms had been in place approximately four years and the fence posts about seven years.

A higher percentage of poles than posts is attacked. In areas of severe damage it is not uncommon for 100 per cent of utility pole structures to show signs of attack. The incidence is lower in fence posts which are spaced closer together. For example, in a part of the Laguna Atascosa Refuge where every utility pole showed substantial damage, only 17 per cent of the fence posts contained damage. The fence posts were one rod apart while the utility poles were approximately 500 feet apart.

Approximately 16 per cent of 1,887 creosoted pine posts in six lines at the Laguna Atascosa Refuge were damaged. Furthermore, 2.5 per cent contained completed roosting or nesting holes. The posts had been in place from two to seven years.

Damage was most severe on fence lines where there were either solid stands of mesquite-scrub or mesquite-scrub bordered by grassland. Less damage was

found on lines where at least one side of the fence line was bordered by a cultivated field. Wherever fence lines departed from chaparral, woodpecker damage ceased within 40 to 50 yards.

RELATIONSHIP OF DAMAGE TO WOOD TREATMENT

C. T. Day, a utility engineer in Sonora, Mexico, (in McAtee, 1911) describes woodpeckers "getting fat" on creosote and the inside of poles being "entirely eaten away." Although this may be an exaggerated account, the idea that creosote makes a pole more susceptible to woodpecker damage has persisted.

A program to test this theory was established at the Laguna Atascosa National Wildlife Refuge with the cooperation and assistance of the U.S. Fish and Wildlife Service. In February 1965, 58 pressure-treated creosoted southern pine posts and 42 untreated southern pine were placed about 20 yards apart along edges of existing fence rows or along clearings through dense chaparral growth. In most instances treated and untreated posts were alternated.

After approximately two months, the posts were examined for signs of attack. Of the untreated posts, 7.3 per cent contained holes or sign of attack and 36.2 per cent of the treated posts contained holes or sign of attack. The extent and degree of damage varied little between treated and untreated posts. None contained completed nesting holes. For the most part, holes went straight into the post for varying distances and did not extend downward. In some cases, attack was limited to a few peck marks or the scaling-off of thin layers at surface of the post.

The fact that the creosoted posts sustained approximately five times as much damage in the first two months suggests that there is a basis for the belief that the wood preservative in some way contributes to making a pole more vulnerable to woodpecker attack. This does not necessarily imply, however, that creosote per se is the attractant. Changes in wood structure during the treating process may be a factor in making a pole more vulnerable. For example, Wood et al. (1960) speak of defects in poles, such as shakes, "that are induced by conditioning and preservative treatment."

Poles and posts with small internal cavities in the form of ring separations in the wood (or shakes) have often been thought to be particularly susceptible to woodpecker attack. In the letter from John W. Rowe quoted earlier, it was suggested that the presence of either heartwood rot or shake made for conditions that stimulated woodpecker attack. This is a theme amplified upon by Dennis (1964), who believed that woodpeckers primarily attack poles to make roosting and nesting cavities, but, because of the presence of shake and other

internal defects, are stimulated to make far more holes than they would in natural tree sites.

It should be added that there is much yet to be learned about a possible connection between the preservative treatment and the susceptibility of a pole to woodpecker attack. Testing has barely begun on this aspect of the problem and any conclusions will have to await long-term results with many more test poles. In April 1965, the number of test posts in the experiment at the Laguna Atascosa Refuge was doubled.

RELATIONSHIP OF DAMAGE TO RESONANCY EFFECTS

Other fence post experiments at Laguna Atascosa were designed to test resonancy or sound effect. McAtee (1911), who expressed the belief that "hum of the wires" had something to do with attracting woodpeckers to utility poles, was repeating a widely held assumption that has persisted to this day. Recent writers have discounted the role of hum or vibration and have substituted other reasons that seem more convincing (Turcek, 1960; Dennis, 1964).

Observations along electric distribution and telephone lines in south Texas, as well as of posts bearing metal signs, have shown that the Ladder-backed frequently selects sites close to metal attachments as places to commence hole drilling. So pronounced is this tendency that attack is often limited almost entirely to the immediate proximity of a metal attachment and is absent elsewhere. A number of examples may be mentioned.

1. In a sample of 17 poles in a heavily damaged electric distribution line, 88 per cent of holes were opposite metal attachments.
2. In a sample of 50 poles in a heavily damaged telephone line, all holes were opposite metal attachments on the crossarms.
3. At Laguna Atascosa Refuge about 2.5 per cent of the creosoted pine posts bear official metal U.S. Fish and Wildlife Service boundary marker signs. In a fence line containing 525 posts, 13 with signs attached sustained a damage rate of 84.6 per cent; the 512 posts without metal signs sustained a damage rate of 15.4 per cent.

This tendency to attack locations opposite metal attachments was tested on a small scale in fence post experiments at the Laguna Atascosa Refuge. A slit 5 inches deep was sawed into the top of 10 creosoted pine fence posts. A 5-inch square of sheet metal was inserted into each slit. Posts containing the hidden metal plates were placed in test strips with 30 unaltered creosoted pine fence posts. As with the other test posts, placement was made in late February and posts were checked in late April. Of the 30 unaltered posts, six (20 per cent) had been attacked; of the 10 posts with metal plates, seven (70 per

FIG. 3. A flat metal plate has been inserted into a groove cut into the top of this creosoted pine fence post. A woodpecker has drilled a hole to the plate. Small holes are scattered about near the large hole.

cent) showed attack. Figure 3 shows attack at a post with a hidden metal plate.

DISCUSSION

The Ladder-backed Woodpecker has been depicted as a tremendously active species whose energies are often directed toward (to us) destructive ends. While its motivation may come chiefly from a drive to excavate roosting and nesting holes, this purpose often seems to be forgotten in the frenzy with which the bird attacks objects or sites responding with a metallic or hollow ring. Many of these sites, such as fencing boards and railings, could not possibly serve as receptacles for nest hole cavities. Even sites of proper dimensions, such as crossarms, may be rendered useless from a functional standpoint by overly energetic drilling that punctures the sides or roof. In spite of many failures and false starts, the Ladder-backed, nevertheless, apparently completes enough cavities for its own use, and at the same time provides nesting sites for other hole-nesters, e.g., House Sparrow (*Passer domesticus*), Bewick's Wren (*Thryomanes bewickii*), Ash-throated Flycatcher (*Myiarchus cinerascens*), and Golden-fronted Woodpecker.

The larger Golden-fronted, to be sure, is probably compelled to enlarge the holes it appropriates. But regardless of elevation or whether the site is in a fence post, X-brace, or pole, the Golden-fronted is as adaptable as the Ladder-backed and readily appropriates the site for roosting or nesting.

Evidence that the preservative treatment makes the pole more susceptible to woodpecker attack is highly hypothetical and needs to be weighed against other factors. There are many regions of North America where woodpecker damage to creosoted or penta-treated poles is unknown. In south Texas, damage by the Ladder-backed seems to be correlated more closely with metallic resonancy than with any of the factors that may be related to the preservative treatment. Utility companies in south Texas, nevertheless, can take comfort from the fact that neither the preservative treatment nor the resonancy characteristics of the pole necessarily make it irresistible to a woodpecker. Habitat appears to be of prime importance. In oak woods supporting large Ladder-backed populations attack may be light or nonexistent. With the presence of suitable natural sites, the birds are apparently under no compulsion to attack utility poles or fence posts.

SUMMARY

The Golden-fronted Woodpecker has usually been blamed for utility pole and fence post damage in south Texas. It is now suggested that the Golden-fronted rarely initiates attack—its role is one of appropriating and enlarging holes already made by the smaller Ladder-backed Woodpecker. Although a wide variety of man-made structures come under attack, the heaviest damage by far is to creosoted pine. In an experiment with pine fence

posts, it was found after two months that creosote treated posts sustained five times as much damage as non-creosoted ones. The role, if any, played by creosote or other wood preservatives in possibly making wood more susceptible to attack is unclear.

Lack of suitable trees for roosting and nesting sites appears to be a highly important factor in making utility poles and fence posts more subject to attack. Heaviest attack is found on lines running through chaparral dominated by mesquite. Attack is also influenced by resonancy factors. Poles and posts exhibiting metallic resonancy or internal hollowness are selected over ones without such features.

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BOX 389, LEESBURG, VIRGINIA, 7 DECEMBER 1965.

NEW LIFE MEMBER

A recent addition to the Life Members of The Wilson Ornithological Society is Dr. Charles Hartshorne, Professor of Philosophy at The University of Texas. A distinguished scholar in his professional field, Dr. Hartshorne has published several books and nearly 200 papers in the area of philosophy. He is, however, seriously interested in ornithology, and has published several papers in that field, particularly about bird song. He is a Field Associate of the Cornell Laboratory of Ornithology, as well as a member of the AOU, the AAAS, and the Texas Ornithological Society. His interest in ornithology has been complimented by an interest in travel, and he has made ornithological observations on all six continents and on many of the oceanic islands. Dr. Hartshorne is married and has one daughter.